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OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

March 28, 2002

MEMORANDUM

Subject: Reregistration of **Mancozeb**: Tomato, Corn, and Cucurbit Crop Field Trial Data; Chemical No. 014504; DP Barcode D228043, D229034, D229035, and D231401; MRID Nos.: 44023101, 44051501, 44074301, 44074302, 44080701, and 44154601.

From: Christine L. Olinger, Chemist  
Reregistration Branch I  
Health Effects Division (7509C)

Through: Whang Phang Ph.D., Branch Senior Scientist  
Reregistration Branch I  
Health Effects Division (7509C)

and

Felecia Fort, Chemist  
Reregistration Branch I  
Health Effects Division (7509C)

To: Anne Overstreet  
Special Review and Reregistration Division (7508W)

The Mancozeb Task Force has submitted crop field trial studies to support the reregistration of the fungicide mancozeb for use on field corn, sweet corn, cucurbits, and tomatoes. These studies have been reviewed by Dynamac Corporation under supervision of HED and the review has been revised to reflect Division policies.

The current studies, in combination with previously submitted data reviewed in the Mancozeb Update and the Mancozeb Registration Standard, fulfill the crop field trial data requirements for use of mancozeb on sweet corn, field corn, tomatoes, cucumbers, melons, and summer squash;

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no additional field trial data are required. The data indicate that the established tolerances for corn forage (both sweet and field) may be too low. Tolerance reassessment will be addressed in the forthcoming Reregistration Eligibility Document (RED).

cc: COlinger, Reg. Std. File,

7509C:RRB1:CLOlinger:clo:CM#2:Rm 722J:305-54063/28/02

RDI: FFort: 5/30/01; WPhang: 03/27/02

**MANCOZEB**  
**PC Code No. 014504; Case 0643**  
**(DP Barcodes D228043, D229034, D229035, and D231401)**

**Registrant's Response To Residue Chemistry Data Requirements**

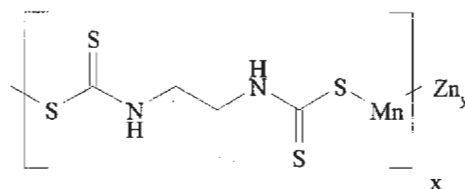
**August 19, 1998**

**Contract No. 68-D4-0010**

**Submitted to:**  
**U.S. Environmental Protection Agency**  
**Arlington, VA**

**Submitted by:**  
**Dynamac Corporation**  
**The Dynamac Building**  
**2275 Research Boulevard**  
**Rockville, MD 20850-3268**

## MANCOZEB



PC Code No. 014504; Case 0643

(DP Barcodes D228043, D229034, D229035, and D231401)

### REGISTRANT'S RESPONSE TO RESIDUE CHEMISTRY DATA REQUIREMENTS

#### BACKGROUND

In response to the Mancozeb Reregistration Standard Update, dated 8/11/92, the Mancozeb Task Force, consisting of Elf Atochem North America, Inc., E.I. du Pont de Nemours and Co., Inc., and Rohm and Haas Company, has submitted data pertaining to the magnitude of mancozeb residues in/on field corn commodities (1996; MRID 44080701), sweet corn commodities (1996; MRID 44154601), cucumbers (1996; MRID 44074301), melons (1996; MRID 44074302), summer squash (1996; MRID 44023101), and tomatoes (1996; MRID 44051501). The submitted data are evaluated herein for adequacy in fulfilling residue chemistry data requirements for the reregistration of mancozeb. The Conclusions and Recommendations stated below pertain only to the topics listed above. All other residue chemistry data requirements stated in the Mancozeb Update are not addressed herein.

A protocol for these field trials has been reviewed by the Agency (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95). We note that on 4/8/98 all mancozeb end-use products registered to DuPont were transferred to Griffin Corporation.

The qualitative nature of the residue in plants and livestock is adequately understood. Mancozeb and ethylenethiourea (ETU) are the residues of concern. Tolerances for residues of mancozeb in/on raw agricultural and processed commodities are currently expressed in terms of residues of a fungicide which is a coordination product of zinc ion and maneb (manganous ethylene bisdithiocarbamate) containing 20 percent manganese, 2.5 percent zinc, and 77.5 percent ethylene-bisdithiocarbamate (the whole product calculated as zinc ethylenebisdithiocarbamate) [40 CFR §180.176 and §180.319]. The Agency has recommended that the tolerance expression for mancozeb be revised to include residues of ETU. The current tolerance enforcement method according to PAM, Vol. II is a colorimetric method (designated as Method III), based on the Keppel method (JAOAC, 54:528-532). Codex limits for EBDC fungicides are grouped under dithiocarbamates. Limits for the dithiocarbamates are established for 19 commodities resulting

from the use of ferbam, ziram, mancozeb, maneb, and zineb (including nabam plus zinc sulfide) and are currently expressed as ppm carbon disulfide. Separate limits (Step 7A) are proposed for ETU present at harvest on eight commodities (does not include any ETU formed during processing). Harmonization of the U.S. tolerances with Codex MRLs is impractical at the present time.

## CONCLUSIONS AND RECOMMENDATIONS

### Storage Stability Data

- 1a. Because cucumber, melon, summer squash, and tomato samples were analyzed within 2 weeks of sample collection, no supporting storage stability data for these commodities are required.
- 1b. Although field corn and sweet corn samples were not analyzed within two weeks of sample collection, the samples were extracted within two weeks. Concurrent fortification indicate adequate recoveries of extracts stored under refrigeration. No additional storage stability data are required to support these studies.

### Crop Field Trials

- 2a. Field corn: The submitted data are acceptable and indicate that the established tolerances for corn forage and fodder may be too low. Combined residues of mancozeb and ETU were 0.705-62.6 ppm in/on 10 samples of field corn forage harvested 1-14 days following the last of 8-10 foliar applications, at 4- to 14-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application. Combined residues of mancozeb and ETU were <0.06 ppm and 1.87-17.4 ppm in/on 10 samples each of field corn grain and fodder, respectively, harvested 35-40 days following the last of 10 foliar applications, at 4- to 14-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application.
- 2b. The submitted data fulfill the crop field trial data requirements for use of mancozeb on field corn; no additional field trial data are required. The registrants must propose increased tolerances for field corn forage and fodder (stover); the available data indicate that tolerances of 65 ppm and 20 ppm, respectively, would be appropriate. At the time of the reregistration eligibility decision for mancozeb, the need for a tolerance for residues in/on field corn grain will be determined.
- 2c. All products labels with use directions on field corn must be amended to state that mancozeb may only be applied to hybrid seed corn. In addition, the product label for EPA Reg. No. 707-179 must be modified to specify a maximum seasonal rate of 12 lb ai/A. The restriction against the feeding of treated forage to livestock must be deleted from the

product labels for EPA Reg. Nos. 1812-414, 1812-415, and 1812-416.

- 3a. Sweet corn: The submitted data are acceptable and indicate that the established tolerances for corn forage and fodder may be too low. Combined residues of mancozeb and ETU were 5.46-109.2 ppm in/on 14 samples of sweet corn forage harvested 7 days following the last of 5 (for corn grown west of the Mississippi River) or 15 (for corn grown east of the Mississippi River) foliar applications, at 3- to 8-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application. Combined residues of mancozeb and ETU were <0.06-<0.072 ppm in/on 14 samples of sweet corn (K+CWHR) harvested 7 days following the same treatment. Combined residues were <0.06-<0.071 ppm and 0.602-63.6 ppm in/on 14 samples each of sweet corn grain and fodder, respectively, harvested 30-54 days following the same treatment.
- 3b. The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update, fulfill the crop field trial data requirements for use of mancozeb on sweet corn; no additional field trial data are required. The registrants must propose increased tolerances for sweet corn forage and fodder (stover); the available data indicate that tolerances of 120 ppm and 70 ppm, respectively, would be appropriate. The available data also indicate that the established tolerance for sweet corn (K+CWHR) can be reduced from 0.5 ppm to 0.1 ppm.
- 3c. All product labels with use directions on sweet corn must be modified to delete the restriction against feeding treated forage to livestock.
- 4a. Cucurbit vegetables group: The submitted data are acceptable and indicate that combined residues of mancozeb and ETU will not exceed the established tolerance in/on cucumbers, melons, and summer squash harvested 5 days following the last of eight foliar applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 2.4 lb ai/A/application (1x the maximum seasonal rate). Combined residues were <0.082-<0.954 ppm in/on 6 samples of cucumbers, <0.06-2.750 ppm in/on 8 samples of melons, and <0.083-0.823 ppm in/on 6 samples of summer squash.
- 4b. The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update and the Residue Chemistry Chapter of the Mancozeb Reregistration Standard, dated 9/10/86, would support a crop group tolerance of 4 ppm for the cucurbit vegetables group. We note that the crop group tolerance proposed by IR-4 (PP#3E4173; CB 11026, DP Barcodes D185414 and D185417, R. Lascola, 5/26/93) includes residues of mancozeb only; the proposed tolerance must be revised to reflect combined residues of mancozeb and ETU.
- 5a. Tomatoes: The submitted data are acceptable and indicate that combined residues of mancozeb and ETU will not exceed the established tolerance in/on tomatoes treated according to the maximum use patterns allowed by the EBDC PD4. Combined residues of

mancozeb and ETU were  $<0.235$  ppm and  $<0.247$  ppm in/on 2 samples of tomatoes grown west of the Mississippi River and harvested 5 days following the last of four foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 1.6 lb ai/A/application. Combined residues of mancozeb and ETU were  $0.204$ - $<0.970$  ppm in/on eight samples of tomatoes grown east of the Mississippi River and harvested 5 days following the last of seven foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 2.34-2.52 lb ai/A/application.

- 5b. The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update and the Mancozeb Registration Standard fulfill the crop field trial data requirements for use of mancozeb on tomatoes; no additional field trial data are required.

## DETAILED CONSIDERATIONS

### Residue Analytical Methods

Samples of field corn and sweet corn commodities from the submitted field trial studies were analyzed for residues of mancozeb and ETU by McKenzie Laboratories (Phoenix, AZ). Samples of cucumbers, melons, summer squash, and tomatoes from the submitted field trial studies were analyzed for residues of mancozeb and ETU by Morse Laboratories (Sacramento, CA). Mancozeb residues were determined using GC with flame photometric detection (McKenzie Laboratories method PRM-005, Rev. 1; Morse Laboratories SOP# Meth-78) and ETU residues were determined using HPLC with electrochemical detection (McKenzie Laboratories method PRM-006, Rev. 1; Morse Laboratories SOP# Meth-17, Revision #2). The limit of quantitation (LOQ) was 0.05 ppm for mancozeb and 0.01 ppm for ETU. Raw data, sample calculations, and representative chromatograms were submitted. Brief discussions of the methods follow.

Mancozeb method: The method involved conversion of EBDC residues to carbon disulfide ( $\text{CS}_2$ ) which was quantitated by GC/FPD. The method was based on methods MTF-88AM-005 and ETU-89AM-001 which have been previously described in conjunction with various field trials. Briefly, residues were extracted with 10% EDTA, 8 N HCl, and 3% stannous chloride solution; water was added to corn fodder samples prior to extraction. The mixture was reacted for 2 hours in a boiling water bath and then maintained at 100 C for analysis. An aliquot of the headspace was analyzed by GC/FPD for  $\text{CS}_2$ .

ETU method: The method was essentially the same as HPLC method MTF-88-AM-004 which has been previously described in conjunction with various field trials. Briefly, samples were combined with water and the pH was adjusted to 11-12 with ammonium hydroxide. Sodium chloride, Celite, and ethanol were added, and the mixture was filtered through Celite. Water was added and the pH was adjusted (if necessary) to 7-9. The extract was concentrated by rotary evaporation and applied to an alumina column; residues were eluted with ethanol:chloroform (4:96, v:v). The eluate was concentrated and redissolved in water for quantitation by HPLC using a Hypercarb column, an isocratic mobile phase of 1-2% acetonitrile in 0.02M phosphoric acid, and electrochemical detection.

The laboratories validated the methods prior to analysis of the field trial samples using untreated samples of field corn and sweet corn commodities (except K+CWHR), and store-bought samples of sweet corn K+CWHR, cucumbers, melons, summer squash, and tomatoes. The results of the method validation analyses are presented in Table 1. In addition, concurrent method recovery data were submitted for each commodity. The results of the recovery analyses of fortified untreated samples are also presented in Table 1. These data indicate that the GC/FPD and HPLC/EC methods are marginally adequate for determining residues of mancozeb and ETU in/on field corn commodities, sweet corn commodities, cucumbers, melons, summer squash, and tomatoes. For sweet corn and field corn commodities, some poor recoveries (<70%) were observed and in some cases (field and sweet corn forage and fodder), average recovery for mancozeb was below 70%.

Table 1. Method validation and concurrent method recoveries of mancozeb and ETU from fortified untreated samples of commodities from the submitted field trial studies.

Crop	Mancozeb			ETU		
	Fortification Levels (ppm)	Number of Samples	% Recovery <sup>a</sup>	Fortification Levels (ppm)	Number of Samples	% Recovery <sup>a</sup>
<b>Method Validation Recovery</b>						
Field corn grain	0.05-0.25	3	72-79 [76±3.6]	0.01-0.05	3	60; 87, 91 [79±16.9]
Field corn forage	0.05-0.25	6	57-67 (3); 70 (3) [65±6.4]	0.01-0.05	3	70-115 [85±26.0]
Field corn fodder	--	--	--	0.01-0.05	3	79-110 [92±15.9]
Sweet corn K+CWHR	0.05-0.25	3	58; 71, 80 [70±11.1]	0.01-0.05	3	61; 100, 102 [88±23.1]
Sweet corn forage	0.05-0.25	3	52-61 [56±4.7]	0.01-0.05	3	79-96 [87±8.5]
Sweet corn grain	0.05-0.25	3	69; 72, 104 [82±19.4]	0.01-0.05	3	61; 100, 105 [89±24.1]
Sweet corn fodder	--	--	--	0.01-0.05	3	87, 104; 124 [105±18.5]
Cucumbers	0.05	1	94	0.01	1	70, 71 <sup>b</sup>
Melons	0.05	1	107	0.01	1	79
Summer squash	0.05	1	86	0.01	1	75, 82 <sup>b</sup>
Tomatoes	0.05	1	111	0.01	1	80

(continued; footnotes follow)



Table 1 (continued).

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Crop	Mancozeb			ETU		
	Fortification Levels (ppm)	Number of Samples	% Recovery <sup>a</sup>	Fortification Levels (ppm)	Number of Samples	% Recovery <sup>a</sup>
<b>Concurrent Method Recovery</b>						
Field corn grain	0.05, 0.25	6	71-91 (5); 129 [87±21.9]	0.01-0.1	6	60, 63; 74-107 (3); 124 [86±25.5]
Field corn forage	0.05-25	6	57-63 (4); 79, 94 [69±14.7]	0.01, 10	7	53-66 (3); 82-112 [81±21.8]
Field corn fodder	0.05-20	8	53-63 (5); 79-102 (3) [69±17.3]	0.01-10	6	54, 63; 70-93 (4) [74±14.6]
Sweet corn K+CWHR	0.05-10	10	60-65 (3); 72-101 (7) [78±13.8]	0.01, 0.05	10	60-68 (4); 77-112 (6) [79±18.0]
Sweet corn forage	0.05-10	12	50-67 (8); 70-92 (4) [65±11.8]	0.01-25.0	10	62; 71-120 (8); 132 [91±23.3]
Sweet corn grain	0.05, 0.25	12	67, 68; 70-114 (10) [81±15.3]	0.01-0.1	12	69; 70-107 (10); 121 [85±15.9]
Sweet corn fodder	0.05-100	12	50-65 (9); 88-95 (3) [64±17.8]	0.01-10	13	53-63 (4); 70-114 (8); 122 [81±22.4]
Cucumbers	0.05, 2.0	6	81-106 [91±9.3]	0.01, 0.25	6	77-104 [86±10.9]
Melons	0.05, 2.0	6	80-120 [95±18.7]	0.01, 0.25	6	77-102 [88±9.3]
Summer squash	0.05, 2.0	4	81-119 [92±18.0]	0.01, 0.25	4	72-105 [91±14.3]
Tomatoes	0.05, 2.0	10	76-116 (8); 124, 125 [97±20.8]	0.01, 0.25	10	73-107 [89±10.3]

- <sup>a</sup> Recovery values outside the acceptable range of 70-120 are listed separately; each value represents one sample unless otherwise indicated in parentheses. Average recovery ± standard deviation in brackets.
- <sup>b</sup> Sample was analyzed in duplicate.

### Storage Stability Data

In the review of protocol for the field trial submissions (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95), the Agency concluded that no additional storage stability data would be required for these samples provided that samples were analyzed within 2 weeks of harvest.

The RAC samples from the field trials were either placed on dry ice and shipped directly to the analytical laboratory or placed in freezers ( $<-7^{\circ}\text{C}$ ) within 4 hours of harvest and then shipped on dry ice to the laboratory within 10 days of sample collection. Samples of sweet corn grain and fodder from one trial in IL were dried in the field for 11 days prior to collection. Samples were stored frozen at the laboratories ( $-20 \pm 5^{\circ}\text{C}$ ) until analysis. Field corn grain, fodder, and forage samples were extracted within 4-14 days of harvest; mancozeb analyses were conducted on the date of extraction and ETU analyses were conducted within 0-13 days of extraction, for total storage intervals of up to 27 days. Sweet corn K+CWHR, forage, grain, and fodder samples were extracted within 6-13 days of harvest, except for the IL samples of grain and fodder which were extracted within 19-20 days of harvest; mancozeb analyses were conducted on the date of extraction and ETU analyses were conducted within 1-12 days of extraction, for total storage intervals of up to 24 days. Extracts were stored refrigerated prior to analysis (Letter, E. Ruckert, Mancozeb Task Force to Anne Overstreet, 5/17/2001). Cucumber, melon, and summer squash samples were analyzed within 4-9 days of collection. Tomato samples were analyzed within 4-14 days of collection.

Because cucumber, melon, summer squash, and tomato samples were analyzed within 2 weeks of sample collection, no supporting storage stability data for these commodities are required. Although the total interval between sampling of the field and sweet corn samples and analysis was greater than two weeks, the samples were extracted within two weeks. The extracts were stored refrigerated, and all concurrent fortifications indicated adequate recoveries, so no additional storage stability data are required.

### Crop Field Trials

The mancozeb products registered to members of the Mancozeb Task Force for use on field and sweet corn, cucumbers, melons, summer squash, and tomatoes are identified in Table 2.

Table 2. Mancozeb products registered to members of the Mancozeb Task Force for use on field and sweet corn, cucumbers, melons, summer squash, and tomatoes.

EPA Reg. No.	Formulation	Label Acceptance Date	Product Name
<b>Rohm and Haas Company</b>			
707-78	80% WP	9/30/98	Dithane M-45® Agricultural Fungicide
707-156	4 lb/gal FIC	12/9/99	Dithane F-45® Flowable Mancozeb Agricultural Fungicide
707-162	3.48 lb/gal FIC	10/11/94	Dithane M-45® Flowable M Agricultural Fungicide
707-179	70% DF	10/11/94	Dithane® DF/70 Agricultural Fungicide
707-180	75% DF	8/15/97	Dithane DF® Agricultural Fungicide
707-241	80% WP	8/15/97	Dithane® WSP Agricultural Fungicide
<b>Griffin Corporation (mancozeb products transferred from E. I. du Pont de Nemours and Co.)</b>			
1812-414 (transferred from 352-449)	75% DF	10/9/98	Manzate® 200 DF Fungicide
1812-415 (transferred from 352-341)	80% WP	10/28/99	Manzate® 200 Fungicide
1812-416 (transferred from 352-398)	4 lb/gal FIC	10/9/98	Manzate® 200 Flowable Fungicide
<b>Elf Atochem North America, Inc.</b>			
4581-358	80% WP	8/31/99	Penncozeb® 80WP Fungicide
4581-370	75% DF	8/31/99	Penncozeb® 75DF 75% Dry Flowable Fungicide

### Field corn

*Established tolerance:* Tolerances are currently established for residues of mancozeb in/on corn grain (except popcorn grain) at 0.1 ppm and in/on corn fodder and forage at 5 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple applications to field corn and hybrid seed corn, at 4- to 14-day intervals, at 0.8-1.2 lb ai/A using ground, sprinkler irrigation, or aerial equipment. Applications are to be made in a minimum of 2 gal/A of water when using aerial equipment; aerial applications in CA are to be made in a minimum of 5 gal/A (Rohm and Haas products only). A 40-day PHI and a maximum seasonal rate of 11.25-12 lb ai/A have been established, with the following exceptions: the 3.48 lb/gal FIC formulation specifies a maximum seasonal rate of 10 lb ai/A; and the 70% DF formulation specifies a maximum seasonal rate of 15 lb ai/A (the EBDC PD4 specifies a maximum seasonal rate of 12 lb ai/A for field corn). The feeding of treated forage to livestock is prohibited (Griffin products only).

The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are also registered for treatment of field corn seeds at 1.9-4.4 oz. ai/100 lb of seed. The use of treated seed for food, feed, or oil purposes is prohibited. A single application for seed treatment may be made in addition to the maximum number of foliar applications.

*Discussion of the data:* The Mancozeb Update concluded that additional field trials were required to support the tolerances for residues of mancozeb in/on field corn grain, fodder, and forage. In their protocol, the Mancozeb Task Force proposed to conduct 5 field trials in Region 5. The Agency concluded that the limited number of proposed test sites were adequate (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95) based on the limitation to use on hybrid seed corn and the presumed availability of adequate data for sweet corn from a less restrictive use pattern.

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44080701) for field corn. Five trials were conducted in IL(2), IA(1), NE(1), and OH(1). Field corn was treated with 10 foliar applications, at 4- to 14-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 1.17-1.24 lb ai/A/application using ground equipment (tractor-mounted or backpack sprayer); total seasonal application rates were 12.0-12.1 lb ai/A. Applications were made in 19.4-38.4 gal/A of water. Field corn forage was collected at the late-dough to early-dent growth stage, from 6 days following the 8th application to 12 days following the 10th application. Field corn grain and fodder were collected at maturity, 35-40 days following the last application.

One control and duplicate treated samples were collected from each test. Samples were placed in freezers (temperature unspecified) within 2.25 hours of harvest and then shipped on dry ice to the analytical laboratory within 10 days of sample collection. Apparent residues of mancozeb were less than the LOQ (<0.05 ppm) and apparent residues of ETU were less than the LOQ (<0.01 ppm) in/on five samples each of untreated field corn grain and fodder and four samples of untreated field corn forage. Detectable residues of ETU were observed in/on one untreated sample of field corn forage at 0.058 ppm (re-analysis of the sample ~2 weeks after the first analysis indicated residues below the LOQ). Residues in/on treated samples are presented in Table 3.

The registrant conducted an additional study to estimate the extent of conversion of mancozeb to ETU using samples of field corn forage fortified with mancozeb. Based on analyses of these samples for residues of ETU, the registrant estimated that ~5.5% of mancozeb residues are converted to ETU during the analysis process. The registrant concluded that 30-55% of the ETU residues found in field corn forage and fodder was actually due to conversion from mancozeb.

Table 3. Residues of mancozeb and ETU in/on field corn commodities treated with 8-10 applications of the 75% DF formulation at 1.2 lb ai/A/application.

Field Corn Commodity	Test Location	Number of Applications	PTI, <sup>a</sup> days	Residues, ppm <sup>b</sup>		
				Mancozeb	ETU	Combined
Forage	IL	10	1	26.5, 57.4	3.03, 5.17	29.5, 62.6
	IL	8	6	1.55, 3.24	0.205, 0.629	1.76, 3.87
	IA	8	14	0.645, 1.08	0.060, 0.116	0.705, 1.20
	NE	10	12	2.16, 3.58	0.263, 0.746	2.42, 4.33
	OH	9	11	10.1, 12.4	1.11, 1.08	11.2, 13.4
Fodder	IL	10	39	4.37, 15.2 <sup>c</sup>	0.874, 2.19	5.24, 17.4
	IL	10	40	3.90, 4.03	0.377, 0.754	4.27, 4.79
	IA	10	35	1.84, 4.28	0.191, 0.874	2.03, 5.16
	NE	10	40	1.63, 3.13	0.248, 0.470	1.87, 3.60
	OH	10	40	2.39, 3.42	0.371, 0.616	2.76, 4.04
Grain	IL	10	39	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	IL	10	40	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	IA	10	35	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	NE	10	40	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	OH	10	40	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06

<sup>a</sup> PTI = Posttreatment interval.

<sup>b</sup> Each residue value represents one sample. Residues in treated samples were not corrected for concurrent method recovery.

<sup>c</sup> Both samples were re-analyzed 21 days after initial analyses; results were 4.53 and 8.24 ppm.

Geographic representation is adequate. The tests were conducted in Region 5 (5 trials) which was the region proposed in the approved protocol.

*Study summary:* The submitted data are acceptable and indicate that the established tolerances for corn forage and fodder may be too low. Combined residues of mancozeb and ETU were 0.705-62.6 ppm in/on 10 samples of field corn forage harvested 1-14 days following the last of 8-10 foliar applications, at 4- to 14-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application. Combined residues of mancozeb and ETU were <0.06 ppm and 1.87-17.4 ppm in/on 10 samples each of field corn grain and fodder, respectively, harvested 35-40 days following the last of 10 foliar applications, at 4- to 14-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application.

The submitted data fulfill the crop field trial data requirements for use of mancozeb on field corn; no additional field trial data are required. The registrants must propose increased tolerances for

field corn forage and fodder (stover); the available data indicate that tolerances of 65 ppm and 20 ppm, respectively, would be appropriate. At the time of the reregistration eligibility decision for mancozeb, the need for a tolerance for residues in/on field corn grain will be determined.

All products labels with use directions on field corn must be amended to state that mancozeb may only be applied to hybrid seed corn. In addition, the product label for EPA Reg. No. 707-179 must be modified to specify a maximum seasonal rate of 12 lb ai/A. The restriction against the feeding of treated forage to livestock must be deleted from the product labels for EPA Reg. Nos. 1812-414, 1812-415, and 1812-416.

### Sweet corn

*Established tolerance:* Tolerances are currently established for residues of mancozeb in/on popcorn grain and fresh corn including sweet corn (kernels plus cob with husk removed) at 0.5 ppm and in/on corn fodder and forage at 5 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple applications to sweet corn (for fresh use, processing, or seed production including hybrid seed) and popcorn, at 4- to 7-day intervals, at 0.8-1.2 lb ai/A using ground, sprinkler irrigation, or aerial equipment. Applications are to be made in a minimum of 2 gal/A of water when using aerial equipment; aerial applications in CA are to be made in a minimum of 5 gal/A (Rohm and Haas products only). A 7-day PHI has been established. For corn grown east of the Mississippi River and in AR and LA, a maximum seasonal rate of 17-18 lb ai/A (15.7 lb ai/A for the 3.48 lb/gal FIC formulation) has been established. For corn grown west of the Mississippi River (except AR and LA), a maximum seasonal rate of 5.6-6 lb ai/A (5.2 lb ai/A for the 3.48 lb/gal FIC formulation) has been established. The feeding of treated forage to livestock is prohibited.

*Discussion of the data:* The Mancozeb Update concluded that additional field trials were required to support the tolerances for residues of mancozeb in/on sweet corn commodities. In their protocol, the Mancozeb Task Force proposed to conduct these additional field trials in Regions 1, 3, 5, 10, and 11 (1 trial each). The Agency concluded that the proposed test sites were inadequate and required two additional field trials in Region 5 (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95).

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44154601) for sweet corn. Seven trials were conducted in CA, FL, IL, MN, OH, NY, and WA. For the CA and WA trials, sweet corn was treated with 5 foliar applications, at 4- to 7-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 1.16-1.21 lb ai/A/application using ground equipment (tractor-mounted sprayer); total seasonal application rates were 6.0 lb ai/A. For the FL, IL, MN, OH, and NY trials, sweet corn was treated with 15 foliar applications, at 3- to 8-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 1.16-1.25 lb

ai/A/application using ground equipment (tractor-mounted sprayer); total seasonal application rates were 17.9-18.2 lb ai/A. Applications were made in 18.9-66.7 gal/A of water. Sweet corn kernels plus cob with husk removed (K+CWHR) and sweet corn forage were collected at commercial maturity, 7 days following the final application. Sweet corn grain and fodder were collected at normal harvest, 30-54 days following the final application. Sweet corn grain and fodder from the IL trial were dried on racks in the field for 11 days.

One control and duplicate treated samples were collected from each test. Samples were placed in freezers (temperature unspecified) within 4 hours of harvest and then shipped on dry ice to the analytical laboratory within 6 days of sample collection. Apparent residues of mancozeb were less than the LOQ ( $<0.05$  ppm) and apparent residues of ETU were less than the LOQ ( $<0.01$  ppm) in/on seven samples each of untreated sweet corn K+CWHR, forage, grain, and fodder. Residues in/on treated samples are presented in Table 4.

The registrant conducted an additional study to estimate the extent of conversion of mancozeb to ETU using samples of sweet corn forage fortified with mancozeb. Based on analyses of these samples for residues of ETU, the registrant estimated that ~5.8% of mancozeb residues are converted to ETU during the analysis process. The registrant concluded that 20-100% of the ETU residues found in sweet corn forage and fodder was actually due to conversion from mancozeb.

Table 4. Residues of mancozeb and ETU in/on sweet corn commodities treated with 5 or 15 applications of the 75% DF formulation at 1.2 lb ai/A/application.

Sweet Corn Commodity	Test Location	Number of Applications	PTI, <sup>a</sup> days	Residues, ppm <sup>b</sup>		
				Mancozeb	ETU	Combined
K+CWHR	CA	5	7	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	WA	5	7	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	FL	15	7	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	IL	15	7	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	MN	15	7	<0.05, <0.05	0.0137, 0.0223	<0.064, <0.072
	OH	15	7	<0.05, <0.05	<0.01, 0.0106	<0.06, <0.061
	NY	15	7	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
Forage	CA	5	7	30.0, 67.7	6.12, 10.4	36.1, 78.0
	WA	5	7	4.90, 5.51	0.817, 0.983	5.72, 6.49
	FL	15	7	44.1, 84.5	9.36, 11.3	53.5, 95.7
	IL	15	7	13.5, 23.6	2.37, 4.12	15.9, 27.7
	MN	15	7	31.5, 87.5	8.62, 21.7	40.1, 109.2
	OH	15	7	44.6, 78.7	12.6, 14.9	57.1, 93.6
	NY	15	7	5.03, 5.90	0.427, 0.770	5.46, 6.67
Grain	CA	5	33	<0.05, 0.0502	<0.01, <0.01	<0.06, <0.06
	WA	5	48	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	FL	15	31	<0.05, <0.05	0.017, 0.021	<0.067, <0.071
	IL	15	30	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	MN	15	54	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	OH	15	39	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	NY	15	44	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
Fodder	CA	5	33	31.4, 59.3	5.00, 4.30	36.4, 63.6
	WA	5	48	0.524, 0.656	0.078, 0.096	0.602, 0.752
	FL	15	31	11.6, 12.7	1.01, 2.44	12.6, 15.2
	IL	15	30	7.06, 9.32	0.180, 1.42	7.24, 10.7
	MN	15	54	14.4, 20.2	3.56, 3.44	17.9, 23.7
	OH	15	39	14.1, 26.5	0.960, 2.62	15.1, 29.1
	NY	15	44	1.26, 1.61	0.064, 0.105	1.33, 1.72

<sup>a</sup> PTI = Posttreatment interval.

<sup>b</sup> Each residue value represents one sample. Residues in treated samples were not corrected for concurrent method recovery.



Geographic representation is adequate. The tests were conducted in Regions 1 (1 trial), 3 (1 trial), 5 (3 trials), 10 (1 trial), and 11 (1 trial) which were the regions required by the Agency in the review of the protocol.

*Study summary:* The submitted data are acceptable and indicate that the established tolerances for corn forage and fodder may be too low. Combined residues of mancozeb were 5.46-109.2 ppm in/on 14 samples of sweet corn forage harvested 7 days following the last of 5 (for corn grown west of the Mississippi River) or 15 (for corn grown east of the Mississippi River) foliar applications, at 3- to 8-day retreatment intervals, of the 75% DF formulation at 1.2 lb ai/A/application. Combined residues of mancozeb and ETU were <0.06-<0.072 ppm in/on 14 samples of sweet corn (K+CWHR) harvested 7 days following the same treatment. Combined residues were <0.06-<0.071 ppm and 0.602-63.6 ppm in/on 14 samples each of sweet corn grain and fodder, respectively, harvested 30-54 days following the same treatment.

The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update, fulfill the crop field trial data requirements for use of mancozeb on sweet corn; no additional field trial data are required. The registrants must propose increased tolerances for sweet corn forage and fodder (stover); the available data indicate that tolerances of 120 ppm and 70 ppm, respectively, would be appropriate. The available data also indicate that the established tolerance for sweet corn (K+CWHR) can be reduced from 0.5 ppm to 0.1 ppm.

All product labels with use directions on sweet corn must be modified to delete the restriction against feeding treated forage to livestock.

### Cucurbit Vegetables Group

The Mancozeb Task Force has stated that they wish to pursue a crop group tolerance for the cucurbit vegetable group. A petition, submitted by IR-4, proposing establishment of a tolerance for residues of mancozeb in/on cucurbits is in reject status (PP#3E4173; CB No. 11026, DP Barcodes D185414 and D185417, R. Lascola, 5/26/93). The petition review noted that additional field trial data were required as described in the Mancozeb Update of 8/11/92.

### Cucumbers

*Established tolerance:* A tolerance is currently established for residues of mancozeb in/on cucumbers at 4 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple foliar applications to cucumbers, at 7- to 10-day intervals, at 1.2-2.4 lb ai/A using ground, sprinkler irrigation, or aerial equipment. Applications are to be made in a minimum of 2 gal/A of water when using aerial

equipment; aerial applications in CA are to be made in a minimum of 5 gal/A (Rohm and Haas products only). A 5-day PHI and a maximum seasonal rate of 19.2 lb ai/A (16.7 lb ai/A for the 3.48 lb/gal FIC formulation) have been established.

*Discussion of the data:* The Mancozeb Update concluded that additional field trials were required to support the tolerance for residues of mancozeb in/on cucumbers. In their protocol, the Mancozeb Task Force proposed to conduct these additional field trials in Regions 2 (2 trials) and 10 (1 trial). The Agency concluded that the proposed test sites were adequate (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95) in consideration of the fact that a crop group tolerance would be proposed [the conclusions on the number of required field trials were based on the OPPTS 860.1500 requirements for crop field trials for the cucurbit vegetables group].

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44074301) for cucumbers. Three trials were conducted in CA, GA, and SC. Mature cucumbers were harvested 5 days following the last of eight foliar broadcast applications, at ~7- to 10-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 2.33-2.49 lb ai/A/application using ground equipment (tractor-mounted or backpack sprayer). Total seasonal application rates were 19.2-19.3 lb ai/A. Applications were made in 19.8-28.0 gal/A of water.

One control and duplicate treated samples were collected from each test. Samples consisted of a minimum of 16 cucumbers. Samples were either placed on dry ice and shipped directly to the analytical laboratory (Morse Laboratories) or placed in freezers (<-18 C) within one hour of harvest and then shipped on dry ice to the laboratory within one day of sample collection. Apparent residues of mancozeb were less than the LOQ (<0.05 ppm) and apparent residues of ETU were less than the LOQ (<0.01 ppm) in/on three samples of untreated cucumbers. Residues in/on treated samples are presented in Table 5.

Geographic representation is adequate. The tests were conducted in Regions 2 (2) and 10 (1) which were the regions proposed in the approved protocol.

### Melons

*Established tolerance:* A tolerance is currently established for residues of mancozeb in/on melons at 4 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple foliar applications to melons (cantaloupes, casaba, crenshaw, honeydew, muskmelons, and watermelons), at 7- to 10-day intervals, at 1.4-2.4 lb ai/A using ground, sprinkler irrigation, or aerial equipment. Applications should be made in a minimum of 2 gal/A of water when using aerial equipment; aerial applications in CA should be made in a minimum of 5 gal/A. A 5-day PHI and a maximum seasonal rate of 18.0-19.2 lb ai/A (16.7 lb ai/A for the 3.48 lb/gal FIC formulation)

have been established.

*Discussion of the data:* The Mancozeb Update did not require any additional field trial data for melons. However, in the review of the protocol the Agency concluded that 4 additional field trials with melons, in Regions 2 (1 trial), 5 (1 trial), and 10 (2 trials), must be conducted (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95) in consideration of the fact that a cucurbit vegetables crop group tolerance would be proposed.

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44074302) for melons. Four trials were conducted in CA(2), GA(1), and IN(1). Mature melons (cantaloupes in 3 trials and Santa Claus melon in 1 trial) were harvested 5 days following the last of eight foliar broadcast applications, at ~7- to 10-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 2.33-2.50 lb ai/A/application using ground equipment (tractor-mounted or backpack sprayer). Total seasonal application rates were 19.1-19.3 lb ai/A. Applications were made in 18.4-26.0 gal/A of water.

One control and duplicate treated samples were collected from each test. Samples consisted of a minimum of 16 melons. Samples were either placed on dry ice and shipped directly to the analytical laboratory (Morse Laboratories) or placed in freezers (<-7 C) within one hour of harvest and then shipped on dry ice to the laboratory within one day of sample collection. Apparent residues of mancozeb were less than the LOQ (<0.05 ppm) and apparent residues of ETU were less than the LOQ (<0.01 ppm) in/on four samples of untreated melons. Residues in/on treated samples are presented in Table 5.

Geographic representation is adequate. The tests were conducted in Regions 2 (1), 5 (1), and 10 (2) which were the regions required by the Agency in the review of the protocol.

### Summer squash

*Established tolerance:* A tolerance is currently established for residues of mancozeb in/on summer squash at 4 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple foliar applications to summer squash, at 7- to 10-day intervals, at 1.4-2.4 lb ai/A using ground, sprinkler irrigation, or aerial equipment. Applications are to be made in a minimum of 2 gal/A of water when using aerial equipment; aerial applications in CA are to be made in a minimum of 5 gal/A (Rohm and Haas products only). A 5-day PHI and a maximum seasonal rate of 18.0-19.2 lb ai/A (16.7 lb ai/A for the 3.48 lb/gal FIC formulation) have been established.

*Discussion of the data:* The Mancozeb Update concluded that additional field trials were required to support the tolerance for residues of mancozeb in/on summer squash. In their

protocol, the Mancozeb Task Force proposed to conduct these additional field trials in Regions 1 (1 trial) and 10 (1 trial). The Agency concluded that the proposed test sites were inadequate and required one additional trial in Region 6 (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95).

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44023101) for summer squash. Three trials were conducted in CA, OK, and PA. Mature summer squash were harvested 5 days following the last of eight foliar broadcast applications, at ~7- to 10-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 2.30-2.50 lb ai/A/application using ground equipment (tractor-mounted, motorized, or backpack sprayer). Total seasonal application rates were 19.0-19.1 lb ai/A. Applications were made in 11.1-28.0 gal/A of water.

One control and duplicate treated samples were collected from each test. Samples consisted of a minimum of 16 squash. Samples were either placed on dry ice and shipped directly to the analytical laboratory (Morse Laboratories) or placed in freezers (<-4 C) within one hour of harvest and then shipped on dry ice to the laboratory within one day of sample collection. Apparent residues of mancozeb were less than the LOQ (<0.05 ppm) and apparent residues of ETU were less than the LOQ (<0.01 ppm) in/on three samples of untreated squash. Residues in/on treated samples are presented in Table 5.

Table 5. Residues of mancozeb and ETU in/on cucumbers, melons, and summer squash harvested 5 days following eight applications of the 75% DF formulation at ~2.4 lb ai/A/application (19.2 lb ai/A/season).

Raw Agricultural Commodity	Test Location	Residues, ppm <sup>a</sup>		
		Mancozeb	ETU	Combined
Cucumbers	CA	0.525, 0.944	<0.01, <0.01	<0.535, <0.954
	GA	<0.05, <0.05	0.032, 0.038	<0.082, <0.088
	SC	0.107, 0.112	0.059, 0.068	0.166, 0.180
Melons	CA	1.61, 2.73	0.015, 0.020	1.625, 2.750
	CA	1.58, 1.79	0.012, 0.015	1.592, 1.805
	GA	<0.05, <0.05	<0.01, <0.01	<0.06, <0.06
	IN	0.08, 0.105	0.03, 0.03	0.11, 0.135
Summer squash	CA	0.121, 0.147	<0.01, <0.01	<0.131, <0.157
	OK	0.073, 0.809	<0.01, 0.014	<0.083, 0.823
	PA	0.062, 0.104	0.023, 0.033	0.085, 0.137

<sup>a</sup> Each residue value represents one sample. Residues in treated samples were not corrected for concurrent method recovery.

Geographic representation is adequate. The tests were conducted in Regions 1, 6, and 10 which were the regions required by the Agency in the review of the protocol.

*Study summary:* The submitted data are acceptable and indicate that combined residues of mancozeb and ETU will not exceed the established tolerance in/on cucumbers, melons, and summer squash harvested 5 days following the last of eight foliar applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 2.4 lb ai/A/application (1x the maximum seasonal rate). Combined residues were <0.082-<0.954 ppm in/on 6 samples of cucumbers, <0.06-2.750 ppm in/on 8 samples of melons, and <0.083-0.823 ppm in/on 6 samples of summer squash.

The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update and the Mancozeb Reregistration Standard would support a crop group tolerance of 4 ppm for the cucurbit vegetables group. We note that the crop group tolerance proposed by IR-4 (PP#3E4173; CB No. 11026, DP Barcodes D185414 and D185417, R. Lascola, 5/26/93) includes residues of mancozeb only; the proposed tolerance must be revised to reflect combined residues of mancozeb and ETU.

### Tomatoes

*Established tolerance:* A tolerance is currently established for residues of mancozeb in/on tomatoes at 4 ppm [40 CFR §180.176].

*Use patterns registered to members of the Mancozeb Task Force:* The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are registered for multiple foliar applications to tomatoes, at 7- to 10-day intervals, at 0.6-1.6 lb ai/A for tomatoes grown west of the Mississippi River or at 0.6-2.4 lb ai/A for tomatoes grown east of the Mississippi River. The 75% DF, 80% WP, and 4 lb/gal FIC formulations (Griffin and Rohm and Haas products only) specify that applications at 0.6-0.8 lb ai/A, for tomatoes grown west of the Mississippi River, or 0.6-1.2 lb ai/A, for tomatoes grown east of the Mississippi River, may be made at retreatment intervals of 3 to 7 days. Applications may be made using ground, sprinkler irrigation, or aerial equipment. Applications are to be made in a minimum of 2 gal/A of water when using aerial equipment; aerial applications in CA are to be made in a minimum of 5 gal/A (Rohm and Haas products only). A 5-day PHI has been established. The maximum seasonal rate for tomatoes grown west of the Mississippi River is 6.4 lb ai/A (5.6 lb ai/A for the 3.48 lb/gal FIC formulation) and the maximum seasonal rate for tomatoes grown east of the Mississippi River is 16.8 lb ai/A (14.6 lb ai/A for the 3.48 lb/gal FIC formulation).

The 80% WP, 70% and 75% DF, and 3.48 and 4 lb/gal FIC formulations are also registered for treatment of tomato seeds at 5.6-6.8 oz. ai/100 lb of seed. The use of treated seed for food, feed, or oil purposes is prohibited. A single application for seed treatment may be made in addition to the maximum number of foliar applications.

*Discussion of the data:* The Mancozeb Update concluded that additional field trials were required to support the tolerance for residues of mancozeb in/on tomatoes. In their protocol, the Mancozeb Task Force proposed to conduct these additional field trials in Regions 1 (1 trial), 2 (1 trial), 3 (2 trials), and 5 (1 trial). The Agency concluded that the proposed test sites were adequate (CB No. 15456, DP Barcode D214382, S. Hummel, 5/11/95).

The Mancozeb Task Force submitted crop field trial data (1996; MRID 44051501) for tomatoes. Five trials were conducted in FL(2), MO(1), NY(1), and NC(1). At the FL, NY, and NC sites, mature tomatoes were harvested 5 days following the last of seven foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 2.34-2.52 lb ai/A/application using ground equipment (tractor-mounted or backpack sprayer); total seasonal application rates were 16.6-17.2 lb ai/A. At the MO site, mature tomatoes were harvested 5 days following the last of four foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation (EPA Reg. No. 707-180) at 1.56-1.59 lb ai/A/application using ground equipment (backpack sprayer); the total seasonal application rate was 6.32 lb ai/A. Applications were made in 19.5-46.3 gal/A of water.

One control and duplicate treated samples were collected from each test. Samples consisted of a minimum of 24 tomatoes. Samples were placed in freezers (<-18 C) within 2 hours of harvest and then shipped on dry ice to the analytical laboratory within 4 days of sample collection. Apparent residues of mancozeb were less than the LOQ (<0.05 ppm) and apparent residues of ETU were less than the LOQ (<0.01 ppm) in/on five samples of untreated tomatoes. Residues in/on treated samples are presented in Table 6.

Table 6. Residues of mancozeb and ETU in/on tomatoes harvested 5 days following applications of the 75% DF formulation.

Test Location	Number of Applications	Application Rate, lb ai/A	Residues, ppm <sup>a</sup>		
			Mancozeb	ETU	Combined
FL	7	2.4	0.534, 0.553	<0.01, 0.010	<0.544, 0.563
FL	7	2.4	0.630, 0.960	<0.01, <0.01	<0.640, <0.970
MO	4	1.6	0.225, 0.237	<0.01, <0.01	<0.235, <0.247
NY	7	2.4	0.382, 0.718	<0.01, 0.014	<0.392, 0.732
NC	7	2.4	0.194, 0.278	0.010, 0.011	0.205, 0.288

<sup>a</sup> Each residue value represents one sample. Residues in treated samples were not corrected for concurrent method recovery.

Geographic representation is adequate. The tests were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (2 trials), and 5 (1 trial), which were the regions proposed in the approved protocol.

*Study summary:* The submitted data are acceptable and indicate that combined residues of mancozeb and ETU will not exceed the established tolerance in/on tomatoes treated according to the maximum use patterns allowed by the EBDC PD4. Combined residues of mancozeb were <0.235ppm and <0.247 ppm in/on 2 samples of tomatoes grown west of the Mississippi River and harvested 5 days following the last of four foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 1.6 lb ai/A/application. Combined residues of mancozeb and ETU were 0.204-<0.970 ppm in/on eight samples of tomatoes grown east of the Mississippi River and harvested 5 days following the last of seven foliar broadcast applications, at 7- to 10-day retreatment intervals, of the 75% DF formulation at 2.34-2.52 lb ai/A/application.

The submitted data, in combination with previously submitted data reviewed in the Mancozeb Update and the Mancozeb Registration Standard fulfill the crop field trial data requirements for use of mancozeb on tomatoes; no additional field trial data are required.

#### EPA MEMORANDA CITED IN THIS REVIEW

CB No.:	12268
DP Barcode:	D193431
Subject:	Response to Mancozeb Reregistration Standard: Plant and Livestock Metabolism Upgrades
From:	R. Perfetti
To:	L. Rossi and E. Saito
Dated:	10/4/93
MRID(s):	42840501
CB No.:	15456
DP Barcode:	D214382
Subject:	Mancozeb (014504). Reregistration Case No. 0643. Mancozeb Task Force Protocol-Field Trials on Field Corn, Sweet Corn, Cucumbers, Potatoes, Tomatoes, and Squash. Crop Group Tolerance proposal for Cucurbits
From:	S. Hummel
To:	J. Loranger/ L. Propst
Dated:	5/11/95
MRID(s):	None
CB No.:	11026
DP Barcode:	D185414 and D185417
Subject:	PP#3E4173: Mancozeb on Cucurbits - Crop Group Tolerance.
From:	R. Lascola
To:	H. Jamerson
Dated:	5/26/93
MRID(s):	None

MASTER RECORD IDENTIFICATION NUMBERS

Citations for the MRID documents referred to in this review are presented below.

44023101 Robinson, P. (1996) Magnitude of the Residues of Mancozeb in the Raw Agricultural Commodity (RAC), The Edible Portion of Summer Squash, Following Eight Sequential Applications of Mancozeb at 2.4 LB AI/Acre to Summer Squash Plants: Final Report: Lab Project Number: ABG 95-0103: ABG PM 95-0103:95ABG0101. Unpublished study prepared by Agri Business Group, Inc. and Morse Laboratories, Inc. 287 p.

44051501 Leppert, B. (1996) Magnitude of Mancozeb Residues in Tomatoes: Final Report: Lab Project Number: SARS-95-31: ML95-0547-MCB: SARS-95-FL-31A. SARS-95-FL-31A. Unpublished study prepared by Stewart Agricultural Research Services, Inc. and Morse Laboratories, Inc. 312 p.

44074301 Robinson, P. (1996) Magnitude of the Residues of Mancozeb in the Raw Agricultural Commodity (RAC), The Edible Portion of Cucumber, Following Eight Sequential Applications of Mancozeb at 2.4 lb AI/Acre to Cucumber Plants: (Final Report): Lab Project Number: ABG PM 95-0102: 95ABG0100: 95ABG100. Unpublished study prepared by Agri Business Group, Inc. and Morse Labs, Inc. 312 p.

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